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EXAMINER	
MCDONALD, RODNEY GLENN	
ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/714,856	LU ET AL.	
	Examiner	Art Unit	
	Rodney G. McDonald	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 February 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14,21 and 22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14,21 and 22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

Claims 2, 6, 13 and 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 2, line 3, the phrase "such as" is indefinite.

Regarding claim 6, line 2, "highly" lacks basis for comparison.

Regarding claim 13, line 2, "highly" lacks basis for comparison.

Regarding claim 21, line 3, "highly" lacks basis for comparison.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of

35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 2, 4, 5, 8, and 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gianetti et al. (US PGPUB. 2004/0081613) in view of Iwasaki et al. (U.S. Pat. 6,270,571).

Regarding claim 1, Gianetti et al. teach using a titanium coated substrate as an anode in an electrolyte to synthesize an anatase phase of titanium dioxide film on a surface by employing electrochemical anodic oxidation. (See Abstract; paragraph 0031-0036; Claim 1)

Regarding claim 8, Giannetti et al. teach that the concentration can be between 0.1 to 1 M. (Paragraph 0032)

Regarding claim 11, Gianetti et al. teach that the time for electrolytic oxidation can be between 5 minutes to 10 hours. (paragraph 0025)

Regarding claim 12, Gianetti et al. teach the temperature can be between 20 to 40 degrees C. (paragraph 0024)

Regarding claim 13, Gianetti et al. teach that the electrolyte can be sulfuric acid. (Paragraph 0032)

The difference between Gianetti et al. and the present claims is that the substrate having a titanium film on the surface for anodic oxidation upon is not discussed (Claim 1), the material of the substrate is not discussed (Claim 2), the titanium film being depositing by sputtering is not discussed (Claim 4) and the titanium film being deposited by evaporation is not discussed (Claim 5).

Regarding claim 1, Iwasaki et al. teach a substrate of titanium, titanium alloy, silica glass, Si or the like. (Column 4 lines 26-30) The substrate can be coated by a film 11 of titanium. (Column 4 lines 31-34; Column 8 lines 30-35) The substrate is then treated by anodic oxidation. (Column 8 lines 35-37)

Regarding claim 2, Iwasaki et al. teach the substrate can be titanium. (Column 4 lines 26-30)

Regarding claims 4, 5, Iwasaki et al. teach the titanium film being depositing by sputtering or evaporation.

The motivation for utilizing the features of Iwasaki et al. is that it allows for increasing production yield. (Column 3 lines 67)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Gianetti et al. by utilizing the features of Iwasaki et al. because it allows for increasing production yield.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gianetti et al. in view of Iwasaki et al. as applied to claims 1, 2, 4, 5, 8 and 11-13 above, and further in view of Gong et al. “Titanium oxide nanotube arrays prepared by anodic oxidation” J. Mater. res., Vol. 16, No. 12, Dec. 2001, pp. 3331-3334.

The difference not yet discussed is that the titanium dioxide film being nano-structured is not discussed (Claim 3).

Regarding claim 3, Gong et al. teach fabricating titanium oxide nanotubes by anodic oxidation. (See abstract)

The motivation for utilizing the features of Gong et al. because it allows for forming a barrier layer structure. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Gong et al. because it allows for forming a barrier layer structure.

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gianetti et al. in view of Iwasaki et al. as applied to claims 1, 2, 4, 5, 8 and 11-13 above, and further in view of Takahashi et al. (US PGPUB 2005/0123745 A1).

The differences not yet discussed is that the electrolyte being a highly alkaline solution containing alkaline metal ions (Claim 6) and the electrolyte being selected from one of potassium hydroxide and sodium hydroxide (Claim 7).

Regarding claim 6, Takahashi et al. teach forming a titanium oxide film by anodic oxidation in either a strong acid or strong alkaline solution. (Paragraph 0036) Sodium hydroxide or potassium hydroxide can be used as the alkaline solution. (Paragraph 0050)

The motivation for utilizing the features of Takahashi et al. is that it allows for producing films having excellent ornamentality. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Takahashi et al. because it allows for producing a film having excellent ornamentality.

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gianetti et al. in view of Iwasaki et al. as applied to claims 1, 2,

4, 5, 8 and 11-13 above, and further in view of Minevski et al. (US PGPUB 2004/0121290 A1).

The difference not yet discussed is using a potentiodynamic mode at a voltage ranging from 30 V to 75 V (claim 9) and using a scanning mode at a scanning rate of below 200 mV/s and a scanning cutoff voltage within 3V to 85 V (Claim 10).

Regarding claim 9, Minevski et al. teach utilizing a voltage of 10 to 150 volts. (Paragraph 0031)

Regarding claim 10, Minevski et al. teach utilzing a scanning mode. The rate is optimizable and the cutoff voltage is considered to be optimizable. (Paragraph 0031)

The motivation for utilizing the features of Minevski et al. is that it allows for forming a biocompatible implant. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Minevski et al. is that it allows for forming a biocompatible implant.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gianetti et al. in view of Iwasaki et al. as applied to claims 1, 2, 4, 5, 8 and 11-13 above, and further in view of Varghese et al. “Crystallization and high-temperature structural stability of titanium oxide nanotube arrays”, J. Mater. Res., Vol. 18, No. 1, Jan 2003, pp. 156-165.

The difference not yet discussed is the step of heating the anatase phase titanium dioxide film under atmospheric pressure for a predetermined length of

time to transform the anatase phase of titanium dioxide film to rutile phase titanium dioxide film (Claim 14).

Regarding claim 14, Varghese et al. teach annealing anatase titanium dioxide to produce the rutile form. (See pages 156-164)

The motivation for utilizing the features of Varghese et al. is that it allows for forming rutile titanium dioxide. (See Pages 156-164)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Varghese because it allows for forming rutile titanium dioxide.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gianetti et al. in view of Iwasaki et al. as applied to claim 1 above, and further in view of Wu et al. “Electrochemical deposition of barium titanate films using a wide electrolytic voltage range", Thin Solid Films 398-399 (2001) 621-625.

Gianetti et al. in view of Iwasaki et al. is discussed above and all is as applies above. (See Gianetti et al. and Iwasaki et al. discussed above)

The differences not yet discussed is utilizing an electrolyte that is a highly alkaline solution containing alkaline metal ions, and wherein the electrochemical anodic oxidation is performed by using a scanning electrolytic voltage mode at a scanning rate below 200 mV/s and a scanning cutoff voltage within 3V to 85 V (Claim 21).

Regarding claim 21, Wu et al. teach utilizing a highly alkaline solution to achieve anodic oxidation. The scanning voltage can be 10 mV/S the cutoff voltage is within 3V to 85V. (See Page 622)

The motivation for utilizing the features of Wu et al. is that it allows for controlling the microstructure of the depositing film. (See abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Wu et al. because it allows controlling the microstructure of the film.

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gianetti et al. in view of Iwasaki et al. and Varghese et al. as applied to claims 1, 2, 4, 5, 8 and 11-14 above, and further in view of Hazmann et al. (U.S. Pat. 5,354,390).

The difference not yet discussed is heating at 500 degrees C for 2 hours. (Claim 22)

Regarding claim 22, Hazmann et al. teach heat treating an anodic oxidation layer from between 120 degrees C to 750 degrees C for 120 minutes. (See Abstract) The layers are transformed by the heat treatment to the rutile phase. (Column 2 lines 38-40)

The motivation for carrying out heat treatment in the ranges suggested by Hazmann et al. is that it allows for transforming the anodic layer into the rutile phase. (Column 2 lines 38-40)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Hazmann et al. because it allows for transforming anodic layer into a rutile phase.

Response to Arguments

Applicant's arguments filed January 23, 2008 and February 21, 2008 have been fully considered but they are not persuasive.

Response to the arguments of the claims rejected under 35 U.S.C. 112 2nd paragraph:

In response to the argument that the term "highly" does not lack basis for comparison because the specification defines acidity to alkalinity from a pH of 0 to 14, it is argued that the term “highly” does not set forth the metes and bounds of the alkalinity. It is suggested to delete this word.

Response to the arguments of claims 1, 2, 4, 5, 8 and 11-13 rejected under 35 U.S.C. 103 as obvious over Giannetti et al. in view of Iwasaki et al.:

In response to the argument that there is no suggestion in Giannetti et al. of using a highly alkaline solution containing alkaline metal ions to produce the film, it is argued that claim 1 the independent claim do not require utilizing alkaline metal ions and Giannetti et al. teach utilizing electrochemical anodic oxidation to synthesize anatase phase titanium dioxide. While claim 6, require an alkaline solution Takahashi et al. suggest using either an alkaline solution or acidic solution to produce titanium dioxide. One of ordinary skill in the art would utilize either solution to produce the titanium dioxide. (See Giannetti et al. and Takahashi et al. discussed above)

In response to the argument that Iwasaki et al. fail to teach preparing the thin film required by the present claims, it is argued that the primary reference to

Giannetti et al. teach forming the thin film required by the claims. (See Giannetti et al. discussed above)

In response to the argument that Iwasaki et al. fail to teach motivation for combining the teachings of Iwasaki et al. with the teachings of Giannetti et al., it is argued that Iwasaki teach the motivation for modifying Giannetti et al. is that it will allow increased production yield of titanium dioxide films. (See Giannetti et al. and Iwasaki et al. discussed above)

Response to the arguments of claim 3 rejected under 35 U.S.C. 103 as obvious over Giannetti et al. in view of Iwasaki et al. and further in view of Gong et al.:

In response to the argument that Gong et al. fail to teach a titanium dioxide film that is nano-granular structured, it is argued that in Figs. 1 and 2 the structure appears granular. Since the nanotubes are of the nano order the film is nano granular. (See Gong et al. discussed above).

Response to the arguments of claims 6 and 7 rejected under 35 U.S.C. 103 as obvious over Gianetti et al. in view of Iwasaki et al. and further in view of Takahashi et al.:

In response to the argument claims 6 and 7 are allowable based on the arguments above, it is argued that claims 6 and 7 are not allowable based on the arguments presented above.

Response to the arguments of claims 9 and 10 rejected under 35 U.S.C. 103 as obvious over Gianetti et al. in view of Iwasaki et al. and further in view of Takahashi et al.:

In response to the argument claims 9 and 10 are allowable based on the arguments above, it is argued that claims 9 and 10 are not allowable based on the arguments presented above.

Response to the arguments of claim 14 rejected under 35 U.S.C. 103 as obvious over Gianetti et al. in view of Iwasaki et al. and further in view of Takahashi et al.:

In response to the argument claim 14 are allowable based on the arguments above, it is argued that claim 14 is not allowable based on the arguments present above.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M-Th with every Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rodney G. McDonald/
Primary Examiner, Art Unit 1795

Rodney G. McDonald
Primary Examiner
Art Unit 1795

RM
May 15, 2008